

1. (Twice Amended) An isolated polynucleotide selected from:
- (a) a polynucleotide encoding a thermostable phosphatase comprising an amino acid sequence as set forth in SEQ ID NO:28;
- (b) a polynucleotide which is complementary to the polynucleotide of (a); and
- (c) a polynucleotide comprising at least 15 contiguous bases of the polynucleotide of (a), wherein the polynucleotide of (b) or (c) hybridizes to a polynucleotide that encodes a polypeptide having activity as a thermostable phosphatase.
2. (Twice Amended) An isolated polynucleotide selected from the group consisting of:
- (a) SEQ ID NO:19;
- (b) SEQ ID NO:19, where T can also be U; and
- (c) fragments of a) or b) that are at least 15 contiguous bases in length and that will hybridize to DNA which encodes the amino acid sequence of SEQ ID NO:28, wherein the isolated polynucleotide of (a) or (b) encodes a thermostable phosphatase, or an enzymatically active fragment thereof.

5. (Twice Amended) An isolated polynucleotide comprising a member selected from:
- (a) a polynucleotide having at least 70% identity to a polynucleotide encoding an enzyme encoded by the DNA contained in ATCC Deposit No. 97379, wherein said enzyme is obtained from *Ammonifex degenesii* KC4 and encodes a thermostable phosphatase;
 - (b) a polynucleotide complementary to the polynucleotide of (a); and
 - (c) a polynucleotide comprising at least 15 contiguous bases of the polynucleotide of (a), wherein the polynucleotide of (b) or (c) hybridizes to a polynucleotide that encodes a polypeptide having thermostable phosphatase activity.

10. (Twice Amended) A thermostable phosphatase of which at least a portion is encoded by a polynucleotide of claim 1, and which is selected from:
- (a) a thermostable phosphatase comprising an amino acid sequence which is at least 70% identical to an amino acid sequence as set forth in SEQ ID NO:28; and
 - (b) a thermostable phosphatase which comprises at least 30 contiguous amino acid residues of the enzyme of (a).

11. (Twice Amended) An enzyme of which at least a portion is encoded by a polynucleotide of claim 1, and which is selected from:
- (a) a thermostable phosphatase comprising an amino acid sequence selected from the group of amino acid sequences set forth in SEQ ID NO:28; and
 - (b) a thermostable phosphatase which comprises at least 30 contiguous amino acid residues of the enzyme of (a).